

U.S. Application Serial No. 10/575,658  
Atty. Docket No. 10191/4142  
RCE Response to Final Office Action of August 24, 2010

**AMENDMENTS TO THE CLAIMS:**

The listing of claims will replace all prior versions, and listings, of claims in the application.

**LISTING OF THE CLAIMS:**

1-9. (Canceled).

10. (Previously Presented) A device for determining an instant a vehicle makes contact with an impact object, comprising:

a determining arrangement for determining the instant of contact by approximating a signal derived from an acceleration signal using a quadratic function.

11. (Previously Presented) The device as recited in claim 10, further comprising:  
an arrangement for one of filtering the acceleration signal and integrating the acceleration signal once or twice.

12. (Previously Presented) The device as recited in claim 10, wherein the determining arrangement takes into account an impact velocity when determining the instant of contact.

13. (Previously Presented) The device as recited in claim 12, wherein the determining arrangement determines the impact velocity as a function of a vehicle velocity.

14. (Previously Presented) The device as recited in claim 13, wherein the determining arrangement determines the impact velocity as a function of a surrounding-field signal.

15. (Previously Presented) The device as recited in claim 10, further comprising:  
an approximating arrangement for approximating the signal using at least two threshold values.

16. (Canceled).

17. (Previously Presented) The device as recited in claim 10, wherein the determining arrangement determines the instant of contact from a vertex of the quadratic function.

18. (Previously Presented) The device as recited in claim 17, wherein the determining arrangement takes into account an impact velocity linearly in the determination of the instant of contact.

19. (Previously Presented) The device as recited in claim 10, further comprising:  
an approximating arrangement for approximating the signal using four threshold values.

20. (Previously Presented) The device as recited in claim 13, further comprising:  
an approximating arrangement for approximating the signal using four threshold values.

21. (Previously Presented) The device as recited in claim 13, further comprising:  
an approximating arrangement for approximating the signal using two threshold values.

22. (Previously Presented) The device as recited in claim 10, wherein the determining arrangement determines the instant of contact from a vertex of the quadratic function, and wherein the determining arrangement takes into account an impact velocity linearly in the determination of the instant of contact.

23. (Previously Presented) The device as recited in claim 22, further comprising:  
an approximating arrangement for approximating the signal using two threshold values.

24. (Previously Presented) The device as recited in claim 13, further comprising:  
an approximating arrangement for approximating the signal using four threshold values.

25. (New) A method for determining an instant when a vehicle makes contact with an impact object, the method comprising:

sensing an acceleration, using an acceleration sensor in a control unit, and generating an acceleration signal;

providing the acceleration signal to an input of a microcontroller in the control unit;

smoothing the acceleration signal in a smoothing operation using a filter, the filtering including providing a double integration of the acceleration signal to provide a lower-frequency function on which an approximating function is to be performed;

performing the approximation based on interpolation points on the twice integrated acceleration signal, wherein the interpolation points are determined by threshold values and by the times at which the approximating function assumes the threshold values;

determining a vertex from the approximating function, wherein in a first approximation, the vertex determines the instant of contact to provide a first determined instant of contact; and

determining another instant of contact by subtracting a period of time, which is linearly dependent on the impact velocity, from the first determined instant of contact.

26. (New) A device for determining an instant when a vehicle makes contact with an impact object, comprising:

a sensing arrangement, in a control arrangement, for sensing an acceleration and generating an acceleration signal, and providing the acceleration signal to an input of a microcontroller in the control unit;

a smoothing arrangement to smooth the acceleration signal in a smoothing operation, the smoothing arrangement including a filter to provide a double integration of the acceleration signal to provide a lower-frequency function on which an approximating function is to be performed;

an approximating arrangement to provide an approximating function to approximate the instant of contact, based on interpolation points on the twice integrated acceleration signal, wherein the interpolation points are determined by threshold values and by the times at which the approximating function assumes the threshold values;

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a vertex determining arrangement to determine a vertex from the approximating function, wherein in a first approximation, the vertex determines the instant of contact to provide a first determined instant of contact; and

a processing arrangement to determine another instant of contact by subtracting a period of time, which is linearly dependent on the impact velocity, from the first determined instant of contact.